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In the United States Patent and Trademark Office
Board of Patent Appeals and Interferences

In re Application of

Inventor: J. Robert Mitchell

Title: FLUIDIC STRUCTURES
WITHIN AN ARRAY PACKAGE

Serial No.: 09/426,111

Filed: Oct. 22, 1999

Hon. Assistant Commissioner for Patents

BOX: BOARD OF PATENT APPEALS AND INTERFERENCES

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Examiner: Patricia K. Bex

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APPEAL BRIEF

A Notice of Appeal was facsimile transmitted on Sept. 3, 2002. A request for a 1-month extension to file the present Appeal Brief is enclosed.

Respectfully submitted,

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APPEAL BRIEF

I. Real Party in Interest

The real party in interest is Agilent Technologies, Inc., assignee of the present application and invention.

II. Related Appeals and Interferences

There are no other related appeals or interferences.

III. Status of Claims

Claims 2-28 and 30-47 are pending and stand rejected. The only independent claims are as follows (claims directly or indirectly dependent on each are indicated in parentheses after each): **5** (7, 8, 10, 11); **6** (2-4, 9); **12** (13-20); **21** (22-28); **31** (30, 42-44); **32** (45-47); **33** (34-41).

IV. Status of Amendments

The last amendments made to the present application were in the before final Amendment and Response filed by facsimile transmission on March 28, 2002. All of the claims remain as amended in the foregoing Amendment and Response, and are incorporated into the attached APPENDIX.

V. Summary of the Invention

The present invention provides a package for an addressable array of multiple features carried on a first side of a substrate (page 2, lines 26-27), as well as a method of exposing an array in such a package to a fluid (page 4, lines 4-5). An embodiment of the array 12 may be disposed on a first surface 11a of a substrate 10 while a second surface 11b of substrate 10 may not carry any such array (page 7, lines 3-5). An array

12 may have at least one hundred or at least one thousand features, such as different polynucleotides of particular sequences (page 7, lines 7-12 and FIGS. 1-3). An embodiment of the array package 30 (see FIGS. 4-6) of the present invention may include a housing 34 which has received a substrate 10 adjacent an opening, with the second surface facing outward (page 7, lines 13-16). The housing 34 is configured such that the housing 34 and substrate 10 define a chamber 36 into which the features 16 of the array 12 face (page 7, lines 17-18). At one end of housing 34 a first port 42 communicates with a cavity 38 and a first set of fluid distribution channels 46 defined between a series of upright baffles 44, while at another end a second port 50 communicates through a cavity 40 into a second set of fluid distribution channels 56 defined between a series of upright baffles 54 (page 7, lines 18-22). Thus, “both the first and second ports 42, 50 can access chamber 36 through respective cavities 38, 40 and first and second sets of distribution channels” (page 7, 24-27 and FIG. 5 in particular). This is also described on page 3, lines 29-32 which recite “For example, the multiple fluid distribution channels may be disposed between a port and the chamber such that fluid flow width increases between the first port to the first set of fluid distribution channels.” First and second sets of channels 46, 56 then, are “positioned in opposed relationship across chamber 36 and just outside the area covered by array 12 (page 8, lines 1-3; FIG. 5). With the foregoing configuration of channels, the channels 46, 56 can direct fluid flow between multiple different regions of chamber 36 across the first side 11a of the substrate 10, to or from the first and second ports 42, 50 (page 8, lines 3-5).

Channels 46, 54 may be valved to prevent or permit fluid flow out of the chamber 36 (page 8, lines 6-7). In one construction the valving is obtained by making the channels capillary sized (page 8, lines 7-11). In another construction, illustrated in FIG. 7, multiple channels 46 (or 54) are valved by each being provided with bubble nucleating resistor 74 (page 8, lines 11-14). When “positive valves such as provided by nucleating resistors 74 are present in first set of channels 46, they can be selectively activated (that is, opened or closed) either continuously and/or in some sequence, to control the flow of wash fluid to different areas of array 12” (page 9, line 31 to page 10, line 2) or in desired pattern (page 4, lines 29-32).

A third port 60 may also access chamber 36 at a position mid-way between the sets of fluid distribution channels 46, 56 (page 7, lines 29-31). All the ports may be closed by resilient closure members (page 7, lines 22-23, lines 31-32).

A sample may be loaded into the package 30 through the third port 60 to directly contact the array, while air is vented through channels 46, 56 and ports 42, 50 (page 8, lines 22-30). When channels 46, 56 are capillary and chamber 36 and channels 46, 56 are filled with fluid, the fluid is retained in chamber 36 by capillary action. Where nucleating resistors 74 are present as the valves these may be activated by an external processor to retain fluid. After the reaction with sample is deemed complete, wash fluid can be forced under sufficient pressure through first port 42 to break any previously established seals in the first set of channels 46, thereby washing out the chamber 36 and array 12 on substrate 10 (page 9, lines 23-31). The channels 46 and 56, by being “positioned in opposed relationship across chamber 36” help direct fluid flow in chamber 36 across the multiple different regions of the substrate 10 (and hence array 12) (page 8, lines 3-5). Again, if valves such as nucleating resistors 74 are present in the first set of channels, they can be “selectively activated (that is, opened or closed) either continuously and/or in some sequence, to control the flow of wash fluid to different areas of array 12, so as to enhance coverage of the wash process” (page 9, line 31 to page 10, line 2).

VI. Issues

The rejections outstanding are summarized in the final Office Action mailed June 3, 2002 as follows:

- A. Are claims 2-11, 30-32, 42-47 properly rejected under 35 U.S.C. 112, first paragraph, as containing subject matter not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention?
- B. Are claims 2-11, 30-32, 42-47 indefinite under 35 U.S.C. 112, second paragraph?
- C. Is claim 5 anticipated by Winkler et al (US 5,384,261) under 35 U.S.C. 102(b)?
- D. Is claim 5 anticipated by Freeman (WO 96/30124) under 35 U.S.C. 102(b)?
- E. Are claims 2-4, 6, 9, 30, 31, 42 anticipated by Juncosa et al (US 6,225,109)?
- F. Are claims 10, 11 unpatentable under 35 U.S.C. 103(a) over Winkler et al (US 5,384,261) or Freeman (WO 96/30124) in view of Besemer et al (US 6,287,850)?
- G. Are claims 7, 8, 32 unpatentable under 35 U.S.C. 103(a) over Winkler et al. (US 5,384,261) or Freeman (WO 96/30124) in view of Jun et al (“Valveless Pumping using Transversing Vapor Bubbles in Microchannels”)?
- H. Are claims 43-44 unpatentable under 35 U.S.C. 103(a) over Juncosa et al (US 6,225,108) in view of Katoot et al. (US 6,184,030)?
- I. Are claims 45-47 unpatentable over Winkler et al (US 5,384,261) or Freeman (WO 96/30124) in view of Jun et al. (“Valveless Pumping using Transversing Vapor Bubbles in Microchannels”)?

VII. Grouping of Claims

For the reasons discussed in Section VIII below, claims within each group identified by the Examiner within a rejection, are considered to stand or fall together for the purposes of that rejection with the exception of Issue E. In Issue E claim 9 does not stand or fall with the remainder of the claims in that rejection for the additional reason provided below.

VIII. Argument

Issue A. – Rejection of claims 2-11, 30-32, 42-47 under 35 U.S.C. 112, first paragraph, as containing subject matter not described in the specification

First, with regard to this (and other) rejections, the Examiner bears the initial burden of establishing a *prima facie* of rejection. This has been made clear by the Federal Circuit in , for example, *In re Oetiker* 24 USPQ2d 1443 @ 1444 (Fed. Cir.; 1992):

“As discussed in *In re Piasecki* , the examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a *prima facie* case of unpatentability. If that burden is met, the burden of coming forward with evidence or argument shifts to the applicant.”

The Examiner rejected claims 2-11, 30-32, and 42-47 under 35 U.S.C. 112, as having been amended in the Amendment and Response facsimile transmitted on March 28, 2002 to contain matter not supported in the specification. Specifically, the Examiner contended that the phrase in claim 5 “the housing including a first set of multiple fluid distribution channels each disposed between the first port and the chamber” is not supported by the specification. As the Examiner points out, the support required is for the specification to reasonably convey that the applicant had possession of the invention at the time the application was filed. In the present case page 3, lines 29-32 of the present application recites “For example, **the multiple fluid distribution channels may be disposed between a port and the chamber** such that fluid flow width increases between the first port to the first set of fluid distribution

channels.” This alone more than “reasonably conveys” that applicant had the possession of the claimed concept of “the housing including a first set of **multiple fluid distribution channels each disposed between the first port and the chamber**”. Hence this rejection should be reversed for this reason alone.

In addition to the above, page 7, lines 17-18 recite “Housing 34 is configured such that housing 34 and substrate 10, define a chamber 36 into which features 16 of array 12 face.” Array 12 is on substrate 10 (see FIG. 1). Substrate 10 is shown in the top view of an array package of the invention, namely FIG. 4. FIG. 5 (a partially cut away top view of the package of FIG. 4) clearly shows chamber 36. Furthermore, page 7, lines 24-25 recite “In the foregoing manner, both first and second ports 42, 50 can access chamber 36 through respective cavities 38, 40 and first and second sets of distribution channels” (the first and second sets of distribution channels being 46, 56 respectively, in FIG. 5). Thus again, the specification clearly discloses “a first set of multiple fluid distribution channels each disposed between the first port and the chamber”. Again, this alone is clear support for the foregoing claim language and this rejection should be reversed also for this reason alone.

Either item discussed above alone not only “reasonably conveys” that the applicant had possession of the invention at the time the application was filed”, but explicitly does so. Furthermore, when these are considered together they the “reasonably convey” test is clearly met. Accordingly, this rejection should be reversed.

Issue B. – Rejection of claims 2-11, 30-32, 42-47 as indefinite under 35 U.S.C. 112, second paragraph

The Examiner next rejected claims 2-11, 30-32, 42-47 under 35 U.S.C. 112, second paragraph, as being indefinite. The Examiner contended that the “chamber” is defined within the claims as being formed by the substrate 10 and housing 44. The Examiner then stated that FIGS. 4-5 showed that this chamber can extend from the outlet port 42 to the outlet port 50, making the chamber able to house the fluid distribution channels.

First, FIG. 4 shows substrate 10 (with surface 11b) while FIG. 5 is a cut away top view. From a comparison of FIGS. 4 and 5 nothing indicates that the array 10 extends beyond the channels formed between baffles 44, 54. Therefore, the Examiner's interpretation of FIGS. 4 and 5 is incorrect and for this reason alone, the rejection should be reversed. Furthermore, as pointed out above page 7, lines 17-18 recite "Housing 34 is configured such that housing 34 and substrate 10, define a chamber 36 into which features 16 of array 12 face" while page 7, lines 24-25 recite "In the foregoing manner, both first and second ports 42, 50 can access chamber 36 through respective cavities 38, 40 and first and second sets of distribution channels" (the first and second sets of distribution channels being 46, 56 respectively, in FIG. 5). Thus, it is clear that chamber 36 is in fact between the fluid distribution channels 46, 56 in FIG. 5. For this reason alone the present rejection should be reversed.

Second, as to what is required for compliance with 35 USC § 112, second paragraph, the Federal Circuit's discussion in Miles Laboratories Inc. v. Shandon Inc. 27 USPQ 1123 @ 1126 (Fed.Cir. 1993) is instructive:

"The test for definiteness is whether one skilled in the art would understand the bounds of the claim when read in light of the specification. *Orthokinetics*, 806 F.2d at 1576. If the claims read in light of the specification reasonably apprise those skilled in the art of the scope of the invention, § 112 demands no more. *Hybritech*, 802 F.2d at 1385. The degree of precision necessary for adequate claims is a function of the nature of the subject matter. *Id.*"

Further, M.P.E.P. § 2173 outlines the same approach when considering the second paragraph of 35 USC § 112. Turning to claim 5, that claim itself defines a first port, a chamber and a first set of fluid distribution channels "between" the first port and the chamber. Thus, the claim language is totally self-consistent in defining the distribution channels "between" the other two elements. Not only is one skilled in the art "reasonably apprised" of the scope of the claimed invention from the foregoing language, but the language is explicitly clear. For this additional reason, this rejection should be reversed.

Issue C. – Rejection of claim 5 as anticipated by Winkler et al (US 5,384,261) under 35 U.S.C. 102(b)

The Examiner next rejected claim 5 as being anticipated by Winkler et al. Claim 5 recites “a first set of multiple fluid distribution channels each disposed between the first port and the chamber” (i.e. the same chamber). In the final Action the Examiner refers to the housing in Winkler et al. including a first port 411 and “the first set of multiple fluid distribution channels 409 disposed between the first port 411 and the chamber (FIG. 4B).” However, with respect, the Examiner misconstrues Winkler et al. In particular, as can be seen, for example, in FIGS. 5 and 7 of Winkler et al., Winkler et al.’s channels pass over multiple different respective regions of the substrate (not into the same chamber). Again in column 8, lines 29-34, Winkler et al. makes it clear that each “channel” passes over its own unique area on substrate 401. Furthermore, if the Examiner is contending that channels 409 of Winkler et al. are the “fluid distribution channels” of claim 5, then the Examiner has failed to point out where in Winkler et al. is the “chamber” such that the set of multiple fluid distribution channels 409 is disposed between the first port 411 and the “chamber” (into which chamber “the multiple features face”), all as required by claim 5. Accordingly, this rejection should be reversed for this reason alone (i.e. that the Examiner has failed to satisfy her burden of establishing even a *prima facie* case for the anticipation rejection).

Furthermore, it is clear from Winkler et al. that the only possible “chamber” might be argued to be outlet 413, but this does not satisfy the claim 5 requirement for being a chamber into which the multiple features face. Accordingly, for this additional reason (i.e. the referenced in fact do not disclose the claimed invention) the present rejection should be reversed.

It is noted that in “Response to Arguments” section of the final Action, the Examiner states that in relation to the anticipation rejection based on Winkler and that based on Juncosa et al. (see below), that the argument that the channels are not disposed between the first port and the “same” chamber is not germane to the issue since Applicant has not excluded such a feature (i.e. multiple chambers from the claim). While it may be true that multiple chambers are not excluded from the claim, this is not the issue. The issue is with regard to the configuration in relation to the chamber that is recited. The rejected claims recite ““a first set of multiple fluid distribution channels each disposed between the first port and the chamber”. The

Merriam-Webster On-Line Collegiate Dictionary (as of 09/03/02; available at www.merriam.com) provides in the first definition of “the” as follows:

“1 a -- used as a function word to indicate that a following noun or noun equivalent is definite or has been previously specified by context or by circumstance <put *the* cat out>”

Thus “the chamber” refers to the same chamber previously specified in the claim. As a result the fluid distribution channels are disposed between the first port and that specified chamber (not their own different chambers as in Winkler and Juncosa).

Issue D. – Rejection of claim 5 anticipated by Freeman (WO 96/30124) under 35 U.S.C. 102(b)

The Examiner rejected claim 5 under 35 U.S.C. 103(b) as being anticipated by Freeman. The Examiner correctly notes that Freeman discloses that all of the channels disclosed therein are valved by a three-way valve mechanism 90. However, claim 5 recites that “at least some of the fluid distribution channels are valved so as to be selectively closable or openable to prevent or permit fluid flow out of the chamber to the first port” (emphasis added). Merriam-Webster’s On-Line Collegiate Dictionary (as of 09/03/02; available at www.merriam.com) provides the first definition of “select” as follows

“1 : chosen from a number or group by fitness or preference”

Thus, claim 5 requires that at least some of the channels can be chosen from the group to be closed or opened. On the other hand, the three-way valve 90 in Freeman does not allow such selection of any of the channels 89 (they are either all closed or open). In view of this difference between the device in Freeman and the claimed invention, the present rejection should be reversed.

Issue E. – Rejection of claims 2-4, 6, 9, 30, 31, 42 as anticipated by Juncosa et al (US 6,225,109) under 35 U.S.C. 102(b)

The Examiner rejected claims 2-4, 6, 9, 30-31, 42 under 35 U.S.C. 102(e) as being anticipated by Juncosa et al. The Examiner references FIGS. 2 and 18 of Juncosa et al. and identifies chamber 27, 130 which is accessible through a first port 23, 134, which housing includes a first set of multiple fluid distribution channels 25, 142. Considering first FIG. 2, that device is shown in exploded view in FIG. 3 of Juncosa et al. As can be seen in FIG. 3, each port of the fluid distribution channels is disposed between the “first port 23” (Examiner’s characterization) and its own unique “chamber 27”. On the other hand, the rejected claims require “a first set of multiple fluid distribution channels each disposed between the first port and the chamber” (that is, each of the channels are disposed between the first port and the chamber - i.e. the same chamber). The Examiner has not pointed to any such configuration in FIG. 2 of Juncosa et al. nor can any be found.

With regard to FIG. 18 of Juncosa et al., that is the same device as shown in FIG. 17 (perspective view) and FIG. 19 (exploded view) - see column 3, lines 56-59. The “first set of multiple fluid distribution channels 142” are not disposed between the “first port 134” and the same chamber (see preceding paragraph) as required by the claims. Nor is there in fact any same chamber in Juncosa et al.’s FIG. 18 device with which “channels 142” communicate, and into which same chamber the multiple features face (as required by these claims).

Accordingly, for at least the above reasons the Examiner has failed to satisfy her burden of establishing a *prima facie* case of anticipation, and the present rejection should therefore be reversed.

Additional Argument with Respect to Claim 9

Claim 9 additionally requires that the “fluid flow width increases between the first port to the first set of fluid distribution channels”. The Examiner does not attempt to point to any such feature in Juncosa et al. Accordingly, the Examiner has not satisfied her burden and this rejection of claim 9 should be reversed for this additional reason.

Issue F. – Rejection of claims 10, 11 as unpatentable under 35 U.S.C. 103(a) over Winkler et al (US 5,384,261) or Freeman (WO 96/30124) in view of Besemer et al (US 6,287,850)

The Examiner next rejected claims 10, 11 under 35 U.S.C. 103(a) over Winkler et al, or Freeman, or Juncosa et al., in view of Besemer et al.. These claims are directly or indirectly dependent upon claim 5, which is not rejected under this heading and accordingly this rejection should be reversed for the same reasons as claim 5.

Issue G. – Rejection of claims 7, 8, 32 as unpatentable under 35 U.S.C. 103(a) over Winkler et al. (US 5,384,261) or Freeman (WO 96/30124) in view of Jun et al (“Valveless Pumping using Transversing Vapor Bubbles in Microchannels”)

The Examiner next rejected claims 7, 8 and 32 under 35 U.S.C. 103(a) as being unpatentable over Winkler et al., or Freeman, in view of Jun et al. Claims 7; 8 are directly or indirectly dependent upon claim 5 and their rejection should be reversed for the same reasons as claim 5 (which is not rejected under this rejection).

In addition, claims 7, 8, and 32, all require a “first set of multiple fluid distribution channels each disposed between the first port and the chamber” (i.e. the same chamber). As discussed above, Winkler et al. does not disclose such a feature (nor does it suggest such a feature). While Freeman appears to show such an arrangement in Fig. 7b, there is no motivation to use the vapor bubble system of Jun et al. in Freeman’s Fig. 7b device and, even if one did, the claimed invention would be not be obtained. On the first point, it is completely unclear how one could replace Freeman’s three-way valve 90 with the bubble system of Jun et al. (which inherently cannot act as a three-way valve) so one is not motivated by the references to try the combination now suggested by the Examiner. On the second point, even if one did somehow make such a combination the rejected claims require that a bubble formation device be disposed in at least some of the fluid distribution channels (which are each disposed between the first port and the chamber). If one makes the combination suggested by the Examiner (not the references) with Freeman’s Fig. 7b device, then one would simply try to replace the existing valve 90 in some manner

with a bubble valve rather than adding a redundant valve to channels 89 (which is not taught or suggested by Freeman, nor by Jun in which the bubbles are used as a temporary obstruction mechanism during pumping of liquid with other bubbles). Thus, for either of the foregoing reasons (lack of suggestion from the references to make the combination; claimed device still not obtained even if the combination was made), the present rejection of claim 32 should be reversed.

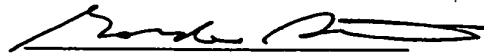
In the “Response to Arguments” section of the final Action the Examiner states again that Jun et al. is relied on for the motivation for using a bubble forming device as a valve therefore reducing the need for valve components. However, there is no motivation to place such a valve into Freeman’s device in FIG. 7B for several reasons. First, each bubble valve still requires a part to form a bubble. Placing five such devices into the channels in Freeman to replace the single three-way valve 90 is not a reduction in parts. Second, as the Examiner points out Freeman’s device uses a three-way valve 90. Jun et al.’s bubble valves are either open or closed, they are not three-way valves as required by Freeman (and it is not clear how bubble valves could even be made three-way). Thus, for either one of the foregoing reasons the references do not provide the motivation for the combination now suggested by the Examiner.

Issues H & I. – Rejection of claims 43-44 as unpatentable under 35 U.S.C. 103(a) over Juncosa et al (US 6,225,108) in view of Katoot et al. (US 6,184,030); Rejection of claims 45-47 as unpatentable over Winkler et al (US 5,384,261) or Freeman (WO 96/30124) in view of Jun et al. (“Valveless Pumping using Transversing Vapor Bubbles in Microchannels”)

The Examiner next rejected claims 43 and 44 under 35 U.S.C. 103(a) as being unpatentable over Juncosa et al, in view of Katoot et al. (USP 6,184,030), and claims 45-47 under 35 U.S.C. 103(a) as being unpatentable over Winkler et al. or Freeman in view of Jun et al. and Katoot et al.. These claims are directly or indirectly dependent upon claims 31 or 32 and their rejection should be reversed for the same reasons as those claims (which are not rejected under this rejection).

Accordingly, for the reasons discussed above, all of the rejections of claims 2-28 and 30-47 should be reversed.

Respectfully submitted,



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APPENDIX – Claims

2. A package according to claim 6, additionally comprising the received substrate.
3. A package according to claim 2 wherein the features comprise different biopolymer sequences.
4. A package according to claim 3 wherein the features comprise different DNA sequences.
5. A package for an addressable array of multiple features carried on a first side of a substrate, comprising a housing which receives the substrate such that the housing and received substrate define a chamber into which the multiple features face, and which chamber is accessible through a first port, the housing including a first set of multiple fluid distribution channels each disposed between the first port and the chamber so as to direct fluid flow between multiple different regions across the first side of the received substrate to or from the first port;
wherein at least some of the fluid distribution channels are valved so as to be selectively closable or openable to prevent or permit fluid flow out of the chamber to the first port.
6. A package for an addressable array of multiple features carried on a first side of a substrate, comprising a housing which receives the substrate such that the housing and received substrate define a chamber into which the multiple features face, and which chamber is accessible through a first port, the housing including a first set of multiple fluid distribution channels each disposed between the first port and the chamber so as to direct fluid flow between multiple different regions across the first side of the received substrate to or from the first port;

wherein at least some of the fluid distribution channels are capillary sized so that capillary action therein will retain fluid in the chamber in the absence of a minimal pressure differential applied across those fluid distribution channels.

7. A package according to claim 5, additionally comprising a bubble formation device in at least some of the fluid distribution channels of the first set, so that when activated a bubble is formed in the corresponding channel to retain fluid in the chamber.

8. A package according to claim 7 wherein the bubble formation device comprises a bubble nucleating resistor.

9. A package according to claim 6 wherein fluid flow width increases between the first port to the first set of fluid distribution channels.

10. A package according to claim 5 wherein the first port includes a closure member normally closing the first port.

11. A package according to claim 10 wherein the closure member comprises a resilient self-sealing member.

12. A package for an addressable array of multiple features carried on a first side of a substrate, comprising a housing which receives the substrate such that the housing and received substrate define a chamber into which the multiple features face, the housing including:

- a first port through which the chamber is accessible;

- a first set of multiple fluid distribution channels each disposed between the first port and the multiple features of the received substrate so as to direct fluid flow between multiple different regions across the first side of the received substrate to or from the first port; and

- a second port on a side of the multiple fluid distribution channels opposite that of the first port.

13. A package according to claim 12, additionally comprising the received substrate.
14. A package according to claim 13 wherein the features comprise different biopolymer sequences.
15. A package according to claim 14 wherein the features comprise different DNA sequences.
16. A package according to claim 12, wherein at least some of the fluid distribution channels are valved such that they can prevent or permit fluid flow out of the chamber to the first port.
17. A package according to claim 12 wherein the fluid distribution channels are capillary sized so that capillary action therein will retain fluid in the chamber in the absence of a minimal pressure differential applied across those fluid distribution channels.
18. A package according to claim 12, additionally comprising a bubble formation device in at least some of the fluid distribution channels of the first set, so that when activated a bubble is formed in the corresponding channel to retain fluid in the chamber.
19. A package according to claim 12 wherein fluid flow width increases between the first port to the first set of fluid distribution channels.
20. A package according to claim 12 wherein the first and second ports each includes a resilient self-sealing closure member normally closing the respective ports.
21. A package for an addressable array of multiple features carried on a first side of a substrate, comprising a housing which receives the substrate such that the housing and received substrate define a chamber into which the multiple features face, the housing including:

a first port through which the chamber is accessible,
a first set of multiple fluid distribution channels each disposed between the first port and the multiple features of the received substrate so as to direct fluid flow between multiple different regions across the first side of the received substrate to or from the first port;
a second port through which the chamber is accessible;
a second set of multiple fluid distribution channels each disposed between the second port and the multiple features of the received substrate so as to direct fluid flow between multiple different regions across the first side of the received substrate to or from the second port; and
a third port which accesses the chamber at a position between the first and second sets of fluid distribution channels.

22. A package according to claim 21, additionally comprising the received substrate.
23. A package according to claim 22 wherein the features comprise different biopolymer sequences.
24. A package according to claim 23 wherein the features comprise different DNA sequences.
25. A package according to claim 22 wherein the fluid distribution channels of the first and second sets are capillary sized so that capillary action therein will retain fluid in the chamber in the absence of a minimal pressure differential applied across those fluid distribution channels.
26. A package according to claim 22, additionally comprising a bubble formation device in at least some of the fluid distribution channels of at least one of the first and second sets, so that when activated a bubble is formed in the corresponding channel to retain fluid in the chamber.

27. A package according to claim 22 wherein fluid flow width increases between the first port to the first set of fluid distribution channels and between the second port to the second set of fluid distribution channels.

28. A package according to claim 22 wherein the first port and second ports include respective resilient self-sealing members normally closing the respective ports.

30. A method according to claim 31 wherein the features comprise different biopolymer sequences.

31. A method of exposing an addressable array of multiple features carried on a first side of a substrate, to a fluid, using a housing and the substrate together so as to define a chamber into which the multiple features face, and which chamber is accessible through a first port, the housing including a first set of multiple fluid distribution channels each disposed between the first port and the chamber of the received substrate, the method comprising:

either adding or removing the fluid through the first port such that fluid flow is directed by the multiple fluid distribution channels between multiple different regions across the first side of the received substrate to or from the first port;

wherein the fluid distribution channels are capillary sized so that capillary action therein will retain fluid in the chamber in the absence of a minimal pressure differential applied across those fluid distribution channels.

32. A method of exposing an addressable array of multiple features carried on a first side of a substrate, to a fluid, using a housing and the substrate together so as to define a chamber into which the multiple features face, and which chamber is accessible through a first port, the housing including a first set of multiple fluid distribution channels each disposed between the first port and the chamber of the received substrate, the method comprising:

either adding or removing the fluid through the first port such that fluid flow is directed by the multiple fluid distribution channels between multiple different regions across the first side of the received substrate to or from the first port;

wherein the package additionally has a bubble formation device in at least some of the fluid distribution channels of the first set, the method additionally comprising activating the bubble formation device in at least one of the fluid distribution channels so as to form a bubble is formed in the corresponding channel to retain fluid in the chamber.

33. A method of exposing an addressable array of multiple features carried on a first side of a substrate, using a housing and the substrate together to define a package which includes:

- a chamber into which the multiple features face;
 - a first port through which the chamber is accessible,
 - a first set of multiple fluid distribution channels each disposed between the first port and the multiple features of the received substrate;
 - a second port through which the chamber is accessible; and
 - a third port which accesses the chamber at a position between the first set of fluid distribution channels and the second port;
- the method comprising:
- (a) adding a first fluid to be tested by the array to the chamber through the third port;
 - (b) adding a wash fluid through the first port such that the wash fluid is directed by the first set of fluid distribution channels from the first port toward multiple different regions across the first side of the substrate; and
 - (c) exhausting fluid through the second port.

34. A method according to claim 33 wherein:

- the package includes a second set of multiple fluid distribution channels each disposed between the second port and the multiple features of the substrate, at least some of the fluid distribution channels of one of the sets being capillary sized so that capillary action therein will retain fluid in the chamber in the absence of a minimal pressure differential applied across those fluid distribution channels;
- the method additionally comprising:

following addition of the first fluid to the chamber, providing less than the minimal pressure differential across the capillary sized fluid distribution channels so as to retain the first fluid in the chamber; and

during addition of the wash fluid providing at least the minimal pressure differential across the capillary sized fluid distribution channels so as to exhaust fluid from the chamber through the capillary sized channels and the outlet port.

35. A method according to claim 33 wherein at least some of the first set of channels are valved, the method additionally comprising selectively activating the valves so as to control wash fluid entry through the first set of channels.

36. A method according to claim 35 wherein all of the fluid distribution channels of the first or second set are capillary sized.

37. A method according to claim 36 wherein all of the fluid distribution channels of the first and second sets are capillary sized.

38. A method according to claim 35 wherein the package includes a second set of multiple fluid distribution channels each disposed between the second port and the multiple features of the substrate, at least some of the fluid distribution channels of one of the sets including a bubble formation device so that when activated a bubble is formed in the corresponding channel to retain fluid in the chamber;

the method additionally comprising:

following addition of the first fluid to the chamber, activating the bubble formation devices so that the first fluid is retained in the chamber.

39. A method according to claim 38 wherein the bubble formation devices comprise bubble nucleating resistors.

40. A method according to claim 38 wherein all of the fluid distribution channels of one of the sets include the bubble formation device..

41. A method according to claim 38 wherein all of the fluid distribution channels of the first and second sets include the bubble formation device.
42. A method according to claim 31 wherein the fluid is a sample to be tested by the array, the method additionally comprising interrogating the array following exposure.
43. A method according to claim 31 wherein the fluid is a sample to be tested by the array and the array is exposed to the sample at a first location, the method additionally comprising interrogating the array following exposure to obtain a result of the exposure, and communicating the result or a conclusion based on the result to a location remote from the first location.
44. A method according to claim 43 wherein the sample was obtained from a location remote from the first location.
45. A method according to claim 32 wherein the fluid is a sample to be tested by the array, the method additionally comprising interrogating the array following exposure.
46. A method according to claim 32 wherein the fluid is a sample to be tested by the array and the array is exposed to the sample at a first location, the method additionally comprising interrogating the array following exposure to obtain a result of the exposure, and communicating the result or a conclusion based on the result to a location remote from the first location.
47. A method according to claim 46 wherein the sample was obtained from a location remote from the first location.

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Inventor(s): J. Robert Mitchell

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Title: FLUIDIC STRUCTURES WITHIN AN ARRAY PACKAGE

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ASSISTANT COMMISSIONER FOR PATENTS
Washington, D.C. 20231

TRANSMITTAL OF APPEAL BRIEF

Sir:

Transmitted herewith in triplicate is the Appeal Brief in this application with respect to the Notice of Appeal filed on Sept. 3, 2002.

The fee for filing this Appeal Brief is (37 CFR 1.17(c)) \$320.00.

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

(X) (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d) for the total number of months checked below:

(X) one month	\$110.00
() two months	\$400.00
() three months	\$920.00
() four months	\$1440.00

() The extension fee has already been filled in this application.

() (b) Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Please charge to Deposit Account 50-1078 the sum of \$430.00. At any time during the pendency of this application, please charge any fees required or credit any overpayment to Deposit Account 50-1078 pursuant to 37 CFR 1.25.

(X) A duplicate copy of this transmittal letter is enclosed.

(X) I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, Washington, D.C. 20231.
Date of Deposit: Dec. 2, 2002 or

I hereby certify that this paper is being facsimile transmitted to the Patent and Trademark Office on the date shown below.

() Date of Facsimile:

Typed Name: Elizabeth Miller

Signature: Elizabeth Miller

Respectfully submitted,

J. Robert Mitchell

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